

Claims

1. A method for the thermal treatment of granular solids in a fluidized bed (3, 3a) which is located in a fluidized-bed reactor (1, 1a), wherein microwave radiation is fed into the fluidized-bed reactor (1, 1a) through at least one wave guide (5), **characterized in** that the irradiation angle of the microwaves is inclined by an angle of 10° to 50°, in particular 10° to 20°, with respect to the principal axis (11) of the fluidized-bed reactor (1, 1a).

2. The method as claimed in claim 1, **characterized in that** a gas stream is fed into the fluidized-bed reactor (1, 1a) through the same wave guide (5).

3. The method as claimed in claim 2, **characterized in that** the gas stream introduced through the wave guide (5) contains gases which react with the fluidized bed (3, 3a).

4. The method as claimed in claim 2 or 3, **characterized in that** the gas stream introduced through the wave guide (5) is additionally utilized for a fluidization of the fluidized bed (3, 3a).

5. The method as claimed in any of claims 2 to 4, **characterized in that** heat is additionally supplied to the fluidized bed (3, 3a) by the introduced gas stream.

6. The method as claimed in any of claims 2 to 4, **characterized in that** the fluidized bed (3, 3a) is cooled by the introduced gas stream.

7. The method as claimed in any of claims 2 to 6, **characterized in that** by means of the gas stream introduced into the wave guide (5) solid deposits are avoided in the wave guide (5).

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8. The method as claimed in any of the preceding claims, **characterized in** that the reactor comprises at least two fluidized-bed reactors (1, 1a), which are separated from each other by weirs or partitions (19, 21) such that solids can move as migrating fluidized-bed from one fluidized-bed reactor (1) into the adjacent fluidized-bed reactor (1a).

9. The method as claimed in any of the preceding claims, **characterized in that** the microwave source (7) is combined with a secondary gassing (6) of a ring conduit and that the wave guide (5) is at the same time used for secondary gassing.

10. The method as claimed in any of the preceding claims, **characterized in that** the used frequency of the microwave radiation is between 300 MHz and 30 GHz, preferably at the frequencies 435 MHz, 915 MHz and 2.45 GHz.

11. The method as claimed in any of the preceding claims, **characterized in that** the temperatures in the fluidized bed (3, 3a) are between 150°C and 1200°C.

12. The method as claimed in any of the preceding claims, **characterized in that** the Particle-Froude-Number Fr_p in the wave guide (5) is 0.1 to 100, preferably 2 to 30.

13. A plant for the thermal treatment of granular solids in a fluidized bed (3, 3a), in particular for performing the method as claimed in any of claims 1 to 12, comprising a fluidized-bed reactor (1, 1a), a microwave source (7) disposed outside the fluidized-bed reactor (1, 1a) and a wave guide (5) for feeding the microwave radiation into the fluidized-bed reactor (1), **characterized in that** the wave guide (5) is inclined by an angle of 10° to 50°, in particular 10° to 20°, with respect to the principal axis (11) of the fluidized-bed reactor (1, 1a).

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14. The plant as claimed in claim 13, **characterized in** that the wave guide (5) has a rectangular or round cross-section, whose dimensions are adjusted in particular to the used frequency of the microwave radiation.

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15. The plant as claimed in claim 13 or 14, **characterized in** that the wave guide (5) has a length of 0.1 m to 10 m.